

WHAT IS CLAIMED IS:

- 1 1. An electron beam duplication lithography apparatus comprising:
2 a first substrate;
3 a field emitter deposited on the first substrate in a predefined pattern;
4 a second substrate positioned a distance from the first substrate;
5 an electron beam resist layer deposited on the second substrate; and
6 circuitry for establishing an electric field to thereby cause an emission of
7 electron beams from the field emitter towards the electron beam resist layer in order
8 to modify the electron beam resist layer in a pattern substantially identical to the
9 predefined pattern.
- 1 2. The apparatus as recited in claim 1, further comprising a magnetic field lens
2 positioned to focus the electron beams as they are emitted from the field emitter
3 towards the electron beam resist layer.
- 1 3. The apparatus as recited in claim 1, further comprising an electric field lens
2 positioned to focus the electron beams as they are emitted from the field emitter
3 towards the electron beam resist layer.

1 4. The apparatus as recited in claim 1, wherein the establishing circuitry further
2 comprises a conductive layer between the first substrate and the field emitter.

1 5. The apparatus as recited in claim 1, wherein the establishing circuitry further
2 comprises a conductive layer between the second substrate and the electron beam
3 resist layer.

1 6. The apparatus as recited in claim 1, further comprising a conductive or
2 dielectric material deposited on the first substrate between portions of the patterned
3 field emitter.

1 7. The apparatus as recited in claim 6, wherein the conductive or dielectric
2 material covers edges of the field emitter.

1 8. The apparatus as recited in claim 6, wherein a surface of the conductive or
2 dielectric material is coplanar with a emitting surface of the field emitter.

1 9. The apparatus as recited in claim 6, wherein an emitting surface of the field
2 emitter is recessed below a surface of the conductive or dielectric material.

1 10. A method for performing duplication lithography, comprising the steps of:
2 providing a first substrate with a field emitter deposited on the first substrate
3 in a predefined pattern;
4 providing a second substrate positioned a distance from the first substrate with
5 an electron beam resist layer deposited on the second substrate; and
6 establishing an electric field to thereby cause an emission of electron beams
7 from the field emitter towards the electron beam resist layer in order to modify the
8 electron beam resist layer in a pattern substantially identical to the predefined pattern.

1 11. The method as recited in claim 10, further comprising positioning a magnetic
2 field lens to focus the electron beams as they are emitted from the field emitter
3 towards the electron beam resist layer.

1 12. The method as recited in claim 10, further comprising positioning an electric
2 field lens to focus the electron beams as they are emitted from the field emitter
3 towards the electron beam resist layer.

1 13. The method as recited in claim 10, wherein a conductive layer is positioned
2 between the first substrate and the field emitter.

- 1 14. The method as recited in claim 10, wherein a conductive layer is positioned
- 2 between the second substrate and the electron beam resist layer.